# DIFFERENT ANAESTHETIC TECHNIQUES IN LAPAROSCOPY

THESIS

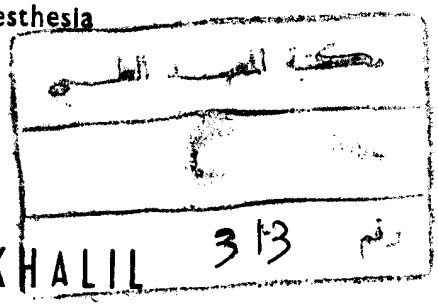
Submitted to the Faculty of Medicine

Alexandria University

In

Partial Fulfilment of the Requirments for

the Master Degree in Anaesthesia




By

SAMIR MORCOSS KHALIL
M. B., B. Ch.

Supervisors :

Prof. Dr. ABDEL RAZEK M. YOUSSEF — Prof. of Anaesthesia, Faculty of Medicine, Alexandria University

Prof. Dr. SAMIR. Y. EL-SAHWI — Prof. of Obestetric & Gynaec., Faculty of Medicine, Alexandria University

Dr. MOHAMED M. IBRAHIM — Lecturer of Anaesthesia, Faculty of Medicine, Alexandria University

1980

ACKNOWLEDGEMENT

I would like to present my utmost and plentiful thanks to Prof. Dr. William Narshy, Head of Department of Anaesthesia who did offer me the possible best chance to execute this study.

I wish to express my deepest thanks and gratitudes to Prof. Dr. Abdel Razek M. Youssef, Professor of Anaesthesia, Faculty of Medicine, Alexandria University, who suggested this topic his supervision and continous encouragement had made the accomplishment of this work possible.

My deep thanks are due to the benifit of discussion with him throughout the work.

I also wish to express my deepest thanks to Prof. Dr. Samir Y. El-Sahwi, Professor of Obstetrics and Gynaecology for his great useful help to execute this study.

I would like also to present my thanks to Dr. Mohamed M. Ibrahim, Lecturer of Anaesthesia, Faculty of Medicine, Alexandria University for his great useful help and unlimited continuous encouragement and close supervision.

Many thanks to all persons who had made this work possible.

CONTENTS



Questions

(1) Best type of anaesthesia for laparoscopy

(2) Why did not he/she Spinal anaesthesia

(3) The reason of the subgrouping

(4) Conclusion 54

Farouk

# CHAPTER 1

# INTRODUCTION.

# INTRODUCTION

## History:

Laparoscopy entails inspection of the structures found inside the peritoneal cavity. It was first used in dogs by Kelling in 1902. The procedure was employed to observe the female genital tract by Nordentoeft as long as 1912 but only become popular following advances in lighting techniques and optical systems[1].

## Technique of the procedure:

The procedure is usually performed with delibrate production of a pneumoperitoneum with certain gases either carbon dioxide, nitrous oxide, air or oxygen in order to get better visualisation of the abdominal viscera. The gas is insufflated by mid-line percutaneous puncture through a verres needle into the peritoneal cavity. The initial flow rate is two litres per minute, later reduced to about 400 ml. per minute in order to maintain an intra-abdominal pressure of 15-20 cm. $H_2O$. The laparoscope is passed into the peritoneal cavity through a small incision below the umbilicus[1].

In recent years in gynaecology carbon dioxide has replaced other gases in laparoscopy[2]. The advantages of using carbon dioxide are declared to be less incidence of gas

embolism and a diminution of shoulder tip pain post-operatively. In addition the use of carbon dioxide allows the safe use of both diathermy for coagulation during biopsy, sterilization, surgery and electronic flash in photography[3].

## PHYSIOLOGICAL CHANGES DURING LAPAROSCOPY

### I. Ventilatory changes:

Increased intra-abdominal pressure with gas insufflation inside the peritoneal cavity will lead to mechanical and physiological changes in both lung volumes and functions[4]. Hodgson et al.[1] and Lewis et al.[3] noticed that there was an increase in the inspired minute volume in spontaneously breathing patients in relation to increased intra-abdominal pressure, but this minute ventilation volume was constant if controlled ventilation was used throughout the procedure. The respiratory rate in spontaneously breathing patients was increased in relation to increased intra-abdominal pressure[1]. Brown et al.[5] had found that after administration of fentanyl as a general systemic analgesic with local analgesics for laparoscopy, the minute ventilation decreased due to decrease in tidal volume but the respiratory rate remains unchanged. Carbon dioxide insufflation leads to minute ventilation increase with a rise in respiratory rate associated with small decrease in tidal volume and vital capacity.

In Trendelenburg position the minute ventilation and the respiratory rate were increased with the tidal volume being essentially unchanged[4]. Scott[6] reported that there was a

marked mechanical resistance to spontaneous ventilation with raised intra-abdominal pressure due to gas insufflation.

Kelman et al.[7], Lewis et al.[3] and Lenz et al.[8] stated that there was an increase in the end expired carbon dioxide concentration accompaning the increase of arterial carbon dioxide concentration, with an increase of $CO_2$ output. Increased intra-abdominal pressure with gas insufflation leads to moderate increase of peak airway pressure in both horizontal and tilted head-down patients[7].

a) Arterial oxygen tension:

Baratz and Karis[9] stated that there was a fall of arterial oxygen tension during laparoscopy in artifically ventilated patients and using carbon dioxide as insufflating gas. Corall et al.[10] showed that there was a decreased arterial oxygen tension. He used nitrous oxide as insufflating gas in spontaneously breathing patients via semi-open circuit and face mask without endotracheal intubation.

In contrast to these findings, Kelman et al.[7] found that there was no evidence of arterial hypoxaemia as a result of abdominal insufflation with considerable quantities of carbon dioxide. They also noticed that increased intra-abdominal pressure was accompanied in both horizontal and tilted head down patients by slight increase in arterial oxygen tension

in controlled ventillation. Using controlled ventilation and carbon dioxide as insufflating gas, Motew et al.[11] noticed no change in arterial oxygen tension during the procedure of laparoscopy.

Alexander et al.[12] using local anaesthetics together with diazepam and fentanyl as systemic analgesic for laparoscopy had found that there was a decrease in arterial oxygen tension and saturation. Brown et al.[5] used the same technique but without diazepam. They noticed that the arterial oxygen tension and saturation did not change with carbon dioxide insufflation.

When using spinal subarachnoid analgesia for laparoscopy and the patients breathed room air there was some increase of arterial oxygen tension due to hyper-ventilation[13].

b) Arterial carbon dioxide tension:

Alexander and Brown[14] compared changes in arterial carbon dioxide tension with carbon dioxide insufflation with that occurred when nitrous oxide was used as insufflating gas. Marshall et al.[15] using carbon dioxide as insufflating gas, Lewis et al.[3], Corral et al.[10] and Marshall et al.[16] used nitrous oxide as insufflating gas.

All of these were done with spontaneous ventilation and the authors stated that arterial carbon dioxide tension was increased when carbon dioxide was used as insufflating gas, but when nitrous oxide was used, the arterial carbon dioxide tension was increased much less or not increased at all compared with carbon dioxide insufflation denoting that this increase was due to absorption of carbon dioxide from the peritoneal cavity to the systemic circulation and not due to impaired ventilation during the procedure. Hodgson et al.[1] noticed that arterial carbon dioxide tension was increased in spontaneously ventilated patients more than in controlled ventilated patients. Kelman et al.[7] showed that carbon dioxide tension in arterial blood in controlled ventilated patients was increased in tilted head-down patients more than the increase occurred when the patients were put in horizontal plane. Brown et al.[5] used local anaesthetics with systemic analgesics for the procedure of laparoscopy and Caceres and Kim[13] used spinal analgesia for laparoscopy. In the two series the patients were allowed to breathe room air with carbon dioxide or nitrous oxide as insufflating gas. The two workers showed no significant increase in arterial carbon dioxide tension due to

hyperventilation occurred which shared in elimination of excess carbon dioxide.

II. Cardiovascular changes:

a) Pulse rate:

Kelman et al.[7] using general anaesthesia with controlled ventilation during the procedure of laparoscopy found that there was an increase in pulse rate in both horizontal and head down position patients after abdominal insufflation with carbon dioxide. They related this tachycardia to the increased intra-abdominal pressure which leads to increased cardiac filling pressure so increased cardiac output and through Bainbridg's reflex leads to this tachycardia. Marshall et al.[15] found similar increase in pulse rate after carbon dioxide insufflation, but this tachycardia may be decreased after administration of beta-adrenergic blockers (Oxprenolol).

Lenz et al.[8] postulated that the pulse rate after carbon dioxide insufflation was increased more in groups receiving general systemic analgesia before anaesthesia than in groups not receiving this systemic analgesics.

Cardiac dysrhythmias are fairly common occurrence during the procedure of laparoscopy[6], because it is

impossible to prevent a degree of hypercarbia especially if respiration is spontaneous when carbon dioxide is used to inflate the abdomen. The most common type of dysrhythmia consisted of ventricular extrasystoles occurring after the P-wave and thus involving fusion with the normally conducted impulse. To a lower degree there were multiple ventricular ectopic beats[17].

b) Arterial blood pressure:

All researches agreed that moderate increase of intra-abdominal pressure with carbon dioxide or nitrous oxide insufflation during laparoscopy, leads to some increase of arterial blood pressure[18, 7, 15, 17, 8, 13].

Increase of intra-abdominal pressure to about 20 cm. $H_2O$ was accompanied by a rise of arterial blood pressure, but when the intra-abdominal pressure reaches 40 cm. $H_2O$ or more, the arterial blood pressure begins to decline and in few patients marked hypotension occurs with this high intra-abdominal pressure[7]. Marshall et al.[16] used Beta-adrenergic blockers after insufflation of carbon dioxide into the peritoneal cavity and noticed that there was some diminution of the increased arterial blood pressure

c) Central venous pressure (C.V.P.) :

Hodgson et al.[1], Scott[6], Marshall et al.[15], Kelman et al.[7] and Smith et al.[19], stated that progressive increase of intra-abdominal pressure will lead to increase in the central venous pressure. The possible cause of this rise is not definite. Scott[6] referred the rise of central venous pressure to the raised pressure of ventilation required to achieve a constant inspired volume once the pneumoperitoneum with carbon dioxide is produced.

Hodgson et al.[1] referred the mechanism of this rise to the transfere of blood from the inferior vena cava to the thoracic cavity in a similar manner to the effect of limb tourniquent[20]. The rise of central venous pressure may probably be due to enhanced sympathetic activity following the increase of arterial carbon dioxide tension[21]. Marshall et al.[15] showed that increase of central venous pressure after carbon dioxide insufflation for laparoscopy did not diminish after administration of beta adrenergic blockers (Oxprenolol).

Kelman et al.[7] showed that progressive increase of intra-abdominal pressure leads to increase of central venous in both horizontal and head-down patients until the

intra-abdominal pressure reaches 40 cm. $H_2O$ which was accompanied with decrease of central venous pressure.

d) Cardiac out-put:

Smith et al.[18] showed that increased intra-abdominal pressure leads to increased cardiac output by about 20%, but Marshall et al.[15], showed that cardiac output was relatively unaffected being increased in some patients and decreased in others. Kelman et al.[7] also found that cardiac output was increased in both horizontal and head-down patients. The possible causes of this increase in cardiac output may be either an increase of cardiac filling pressure due to mechanical factors and to sympathetically-induced constriction of capacitence vessels. The other cause of increased cardiac output was an increase of cardiac efferent sympathetic activity. The relative roles of these two factors cannot be clearly separated. They also stated that it was only at a very high intra-abdominal pressure and then only in some patients that cardiac output may be reduced[7]. In constant to this finding Lenz et al.[8] showed that there was a fall in both stroke volume and cardiac output due to carbon dioxide insufflation and increased after deflation of the abdomen but diminished once more when the patients were returned to the horizontal position from the Trendelenburg's position[8].

The difference between the two series are possibly due to the differing rates of carbon dioxide insufflation (up to 15 minutes in Kelman's series but only four minutes in Lens series). The longer the time interval allows cardiovascular compensation particularly vasoconstriction to occur. Increased arterial carbon dioxide tension in Kelman's series may account for some of the difference in cardiac output.

III. Metabolic changes: Acid Base Status:

It was a general agreement that pneumoperitoneum with nitrous oxide did not lead to any changes in the blood pH of patients whatever the amount of the gas insufflated or the increase in the intra-abdominal pressure. With carbon dioxide insufflation of the peritoneal cavity there was significant decrease in the pH of the arterial blood, and tendency to mild acidosis. This is mainly due to the rapid absorption of carbon dioxide[11, 14 & 22].

Indications of Laparoscopy:

Laparoscopy is used nowadays in both diagnostic and therapeutic purposes in all branches of medicine. It is used in large scale in gynaecology and obstetrics in diagnostic purposes as one of the investigation steps of some gynaecological abnormalities as ammenorrhoea,

dysmenorrhoea and infertility, the causes of obscure pelvic pain and acute or chronic pelvic diseases. Laparoscopy is also used to determine the aetiology of ovarian dystrophy, tuberculosis and endometriosis and for the diagnosis of early extrauterine pregnancy[23,24]. Tubal sterilization can be carried out by laparoscopy. The advantages versus laparotomy are a much lower incidence of post-operative complications and a shorter stay in hospital while still allowing direct inspection of the intra-abdominal contents[25].

Laparoscopy can also be used for investigation and diagnosis of liver disease[26], and to take a liver biopsy[27]. The determination of the aetiology of ascites can be carried out by the aid of laparoscopy[28].

Hazards and complications:

- Cardiac arrest is probably the result of gas embolism[7]. Cardiac arrest can occur due to overdistension of the peritoneal cavity with excessive amount of carbon dioxide[29].
- Possibility of severe bradycardia from reflex increase of cardio-vagal tone consequent with peritoneal manipulation[7].
- Cardiac dysrhythmias and cardio-vascular collapse may occur more commonly in the early insufflation phase with carbon dioxide[3].

- Explosion hazard may occur when diathermy is used in the presence of nitrous oxide as insufflating gas[30].
- Tachycardia and hypotension may result when the intra-abdominal pressure reaches 40 cm $H_2O$ for short time with rapid recovery after deflation[31].
- Injury to the abdominal viscera as thermal injury to the bowel during laparoscopic sterilization[32].
- Injury to the aorta and great vessels with severe haemorrhage[33] or injury to the lumbosacral roots[34].
- Regurgitation with the possibility of aspiration may occur during laparoscopy due to increased intra-abdominal pressure, lithotomy position, steep head down tilt, insufflation of gas in the peritoneal cavity and pressure on the abdomen by the surgeon[35].
- Rare complications due to unexperience of the surgeon:
  - Bleeding from the skin subcutaneous tissue, mesosalpinx, bowel and gastrointestinal perforation.
  - Failed laparoscopy.
  - Pelvic abscess due to infection as late post-operative complication[36].

Contraindications to pelvic laparoscopy:

1. General contraindications:
   - Severe cardio-vascular diseases valvular diseases, congestive heart failure, hypertension and cerebro-vascular diseases[15].
   - Respiratory diseases as asthma, pheumothorax and chronic obstructive lung diseases. These conditions lead to diminution of lung compliance which cannot compensate for the severe ventilatory changes due to insufflation of gas in the peritoneal cavity and restrict the movement of the diaphragm[4].
   - Extreme obesity. This condition leads to difficult insertion of trochar and canula through the anterior abdominal wall or it may not reach the peritoneal cavity at all[37].
2. Local contraindication:
   - Generalised peritonitis.
   - Diaphragmatic hernia.
   - Generalised adhesions.
   - Massive ascites[37].

# CHAPTER II

# AIM OF THE WORK

## AIM OF THE WORK

1. The aim of this work is to investigate three different techniques of anaesthesia for pelvic laparoscopy, namely general anaesthesia with intermitent positive pressure ventilation I.P.P.V., lumbar extradural block and local infiltration associated with systemic analgesics.

2. The vital signs as regards pulse rate and arterial blood pressure are measured, evaluated and discussed during steps of the procedure to define changes due to different drugs used.

3. The effects of carbon dioxide insufflation into the peritoneal cavity and the effect of Trendelenburg position on circulatory dynamics of the patients.

# CHAPTER III

# MATERIAL AND METHODS.

## PATIENTS AND METHODOLOGY

### 1. Patients:

Forty five female patients undergoing laparoscopy for either diagnostic or therapeutic tubal sterilization purposes are chosen. They are of an average age of 15-40 years old and of average weight between 48-75 kilograms. They are clinically free from any chest on heart diseases. Routine laporatory investigation are done.

### 2. Methods:

The forty-five patients will be divided into three groups: 3X15

Group I:

Twenty patients will do laparoscopy under general endotracheal anaesthesia with muscle relaxant and controlled ventilation. Premedication with 1 mg atropine sulphate + 100 mg pethidine are given intramuscularly half an hour before operation. Inducation of anaesthesia is performed with sleeping dose of thiopentone sodium 2.5% given intravenously followed by 2 mg/kg body weight, gallamine triethiodide as muscle relaxant. Artificial ventilation is performed for 2-3 minutes with a mixture of oxygen and nitrous oxide 50% of each followed by insertion of cuffed endotracheal tube

of suitable size under direct laryngoscopy. Maintenance of anaesthesia is with nitrous oxide and oxygen 7 : 5 L/min. respectively supplimented with 0.5 - 1% halothane from fluetic vaporizer. Ventilation is performed with intermittent positive-pressure ventilation "I.P.P.V." through volume prese t Blease ventilator with 700 ml tidal volume. When the procedure is finished the anaesthetics are shut off and ventilation is continued with 100% oxygen. Recovery is induced with 2.5 mg prostigmine sulphate + 1 mg atropine injected intravenously.

Group II:

Ten patients will do laparoscopy with lumbar extra-dural block.

- Pre-medication with 100 mg pethidine given intramuscularly half an hour before the operation.
- Extradural block is performed with 15 ml xylocaine hydro-chloride 1.5% injected in the extradural space between 4th and 5th lumbar vertebrae using Tuohy's needle with the patient in the sitting position.

Technique for extradural block:

- The patient is put in sitting position with the back slightly flexed.
- Sterilization of the back with tincture iodine 2.5% solution.

- Tuohy's needle is inserted in the 4th lumbar space through skin, subcutaneous tissue, supra spinous ligament, intra-spinous ligament and ligamentum flavum till the epidural space with its characteristic of negative pressure.
- Test of negativity is performed with continuous pressure on the plunger of a syringe filled with saline. The plunger should move very freely within its barrel.
- If sure that the needle is in the epidural space a test dose of 5 ml xylocaihe is injected and if in 5 min. there is no evidence of subarachnoid block such as inability to move feet.

  The remainder of the solution is slowly injected. Frequent aspiration tests being made to avoid risk of subarachnoid or intravenous injection.
- The patient is thenturned on the back with slight head-down tilt and a pillow under the shoulder.

Group III:

15 patients will do laparoscopy under the effect of local analgesia, supplimented with systemic analgesics given as pre-medication half an hour before operation.

- Pethidine 100 mg given to five patients.
- 50 mg pethidine + 10 mg Diazepam given to five patients.

- 50 mg pethidine + 30 mg Pentazocine given to five patients.

  20 ml xylocaine hydrochloride 1% are used for local infiltration of infraumbilical region in three directions.

- The first one towards symphesis bupis, the local anaesthetic is injected in the para peritonium, rectus sheath, subcutaneous tissue and the skin.

- The other two directions are to the right and left of the umbilicus for distance of 5 cm in each side. The same procedure of the first direction is repeated. Paracervical block with 5 ml xylocaine 1%, is injected in the points of 3,6,9 and 12 o'clock around the cervix for the instrumental manipulation of the vaginal devices.

All patients under going laparoscopy in this study are slowly insufflated with 2.5-3 L. carbon dioxide to give an intra-abdominal pressure of 20 cm $H_2O$ and are kept in Trendelenburg's position.

Measurements:

The parameters of this study are measured pre-operatively and then after:

- Pre-medication.
- The administration of anaesthesia.

- Insufflation of carbon dioxide.
- Trendelenburg position.
- Deflation of the abdomen from the gas and the patient in the horizontal position.

1. Mean arterial blood pressure.

   The arterial blood pressure is measured by sphygmomanometer and the mean arterial blood pressure assumed to be: Diastolic blood pressure + 1/3 the pulse pressure.

2. Pulse rate/min.:

   Measured by digital palpation of the radial artery in one minute.

Statistics:

$$S.D. = \sqrt{\frac{\text{Sum of squares} - \frac{\text{square of the sum}}{n}}{n - 1}}$$

$$t = \frac{\text{mean difference}}{\frac{S.D.}{\sqrt{n}}}$$

n = No. of cases.

S.D. = Standard deviation.

# CHAPTER IV

# RESULTS

# RESULTS

This work was performed on 45 female patients, 29 of them for diagnostic purposes and 16 cases for tubal ligation. All of them were clinically free as judged by clinical and routine laboratory investigations. From the anaesthetic point of view they were divided into three groups:

1. Group I:

Twenty patients in whom the procedures were performed under the effect of general endotracheal anaesthesia with gallamine triethiodide as muscle relaxant and thiopentone as induction agent. Anaesthesia was maintained with nitrous oxide 7 L. and oxygen 5 L. supplimented with 0.5 - 1.0% fluothane.

Ventilation was controlled throughout the procedure.

2. Group II:

Ten patients underwent the procedure with extradural analgesia using xylocaine 1.5% and premedicated with 100 mg pethidine.

3. Group III:

Fifteen patients under-went the procedure with local analgesia and pre-medicated with either:

Sub-group a) Five patients with: 100 mg pethidine

Sub-group b) Five patients with: 50 mg pethidine + 10 mg diazepam.

Sub-group c) Five patients with: 50 mg pethidine + 30 mg pentazocine.

Group I:

The twenty patients of this group aged from 15-39 years. Their weights ranged from 48-70 kg.

Sixteen patients of them under went diagnostic laparoscopy and four patients did laparoscopic tubal ligation (Table I).

1. Changes in pulse rate/min. during different steps of the operation. (Table II and Fig. 1).

Pulse rate/min. in the pre-operative period ranged from 76-98 beats/min. with a mean value 85.5 ± 14.05 beats/min. After induction of anaesthesia (with thiopentone 2.5% and gallamine for muscular relaxation) . The pulse rate ranged from 76 - 102 beats/min. with a mean value 88.1 ± 6.055 beats/min. The increase is significant (t = 1.921). In Trendelenburg significant increase in pulse rate/min. was observed. It ranged from 84-130 beats/min. with a mean value 102.6 S.D. ± 17.129 beats/min. (t = 4.49). After $CO_2$ insufflation the pulse rate/min. ranged from 90-120

beats/min. with a mean value 102.6 S.D. ± 9.583 beats/min. The increase is significant (t = 8.175).

At the end of the procedure and deflation of all residual carbon dioxide from the abdomen in normal flat position, pulse rate showed significant increase, it ranged from 82 - 98 beats/min. with a mean value 90.1 ± 5.112 beats/min. (t = 4.024).

2. Changes in the mean arterial blood pressure:

The mean arterial blood pressure ranged from 83.3 - 110 torr with a mean value 92.4 torr pre-operatively, S.D. ± 5.325.

After induction of anaesthesia the mean arterial blood pressure was significantly decreased. It ranged from 83.3 - 100.7 torr with a mean value 91.14 torr (S.D. ± 3.159 and t = 1.784).

As a result of intraperitoneal insufflation of carbon dioxide, all the patients showed significant increase in mean arterial blood pressure. It ranged from 91.3 - 120.0 torr with a mean value 98-295 torr (S.D. ± 5.514 and t = 8.673).

In Trendelenburg position the mean arterial blood pressure showing significant increase, it ranged from 88.3-106.3 torr with a mean value of 95.87 torr (S.D. ± 4.617 and t = 3.313).

At the end of the procedure the mean arterial blood pressure ranged from 88.3 - 103.3 torr with a mean value 94.205 (S.D. ± 5.048 torr).

The increase was insignificant (t = 1.457).

Group II:

Ten patients in whom the laparoscopy procedure was done under the effect of spinal extradural analgesia. Their age ranged from 17 - 38 years with a mean value 28.6 years and their weights ranged from 60-75 kgs. Five patients of them underwent diagnostic laparoscopy and the other five for laparoscopic tubal ligation (Table IV).

1. Changes in pulse rate/min. (Table V and Fig. 3).

The preoperative data of group II showed that the pulse rate/min. ranged from 78-92 beats/min. with a mean value of 82 beats/min. (S.D. ± 14.071).

After 15 minutes from the injection of xylocaine and at the beginning of the procedure the pulse rate/min. showed insignificant decrease. It ranged from 72-90 beats/min. with a mean value of 81 beats/min. (S.D. ± 5.437 and t = 0.560).

Trendelenburg's position causes significant increase in pulse rate. It ranged from 76 - 96 beats/min. with a mean value 88.6 beats/min. (S.D. ± 6.257 and t = 3.335).

With insufflation, the pulse rate ranged from 72 - 98 beats/min. with a mean value 89.6 beats/min. (S.D. ± 8.208). The increase was significant (t = 2.927).

After deflation of the abdomen from carbon dioxide and the patients in horizontal plane. The pulse rate ranged from 72 - 88 beats/min. with a mean value 80.4 (S.D. ± 5.846) beats/min. The decrease was insignificant (t ⇾ 0.973).

2. Changes in the mean arterial blood pressure (Table VI and Fig. 5).

The pre-operative mean arterial blood pressure in Group II ranged from 86.7 - 95.3 torr with a mean value 92.35 torr ± 2.652.

After injection of xylocaine the mean arterial blood pressure showed significant increase. It ranged from 86.7 - 103.3 torr with a mean value 94.58 (S.D. ± 2.882 and t = 2.459).

Insufflation of carbon dioxide intraperitoneally, there was a significant increase in the mean arterial blood pressure. It ranged from 93.3 - 110.6 torr with a mean value 102.38 torr (S.D. ± 3.722 and t = 8.530).

Insignificant increase in the mean arterial blood pressure occurred with Trendelenburg position.

It ranged from 86.7 - 103.3 torr with a mean value 95.13 torr (S.D. ± 4.893 and t = 1.778).

At the end of the procedure, the mean arterial blood pressure showed insignificant decrease in its value. It ranged from 88.3 - 97.0 torr with a mean value 92.01 torr (S.D. ± 3.054 and t = 0.341).

Group III: Patients under local analgesia.

Eight of these 15 patients underwent diagnostic laparoscopy and the seven patients for therapeutic tubal sterilization.

The five patients of sub-group (a) were pre-medicated with 100 mg. pethidine; age ranged from 22 - 36 years with a mean value 28 years and weights ranged from 55 - 75 kg (Table VIIa).

The five patients of sub-group (b) (pre-medicated with 50 mg. pethidine + 10 mg. diazepam) had an age ranged from 22 - 35 years with a mean value 29.8 years and weight ranged from 65 - 75 kg (Table VII b).

The five patients of sub-group (c): (premedicated with 50 mg. pethidine + 30 mg pentazocine) had an age ranged from 20 - 38 years with a mean value 28.6 years and weights ranged from 56 - 75 kg (Table VII c).

I. Changes in pulse rate/min. (Table VIII a and b and Fig. 3).

1. The pre-operative data of the three sub-group showed: sub-group a: Pulse rate/min. ranged from 86-100 beats/min. with a mean value 90.4 beats min. (S.D. ± 5.727). Sub-group b: Pulse rate/min. ranged from 76-82 beats/min. with a mean value 80 beats/min. (S.D. ± 4.42.

Sub-group c: Pulse rate/min. ranged from 86-92 beats/min. with a mean value 89.2 beats/min. (S.D. ± 2.28).

2. After injection of local anaesthetic drug (xylocaine 1.5%).

Sub-group a: Pulse rate/min. showed significant decrease. It ranged from 70-92 beats/min. with a mean value of 80.8 beats/min. (S.D. ± 5.899 (t = 3.639).

Sub-group b: Pulse rate/min. showed insignificant decrease. It ranged from 76 - 80 beats/min. with a mean value of 78 beats/min. (S.D. ± 1.414 and t = 1.163).

Subgroup c: Pulse rate/min. showed insignificant decrease. It ranged from 88 - 94 beats/min. with a mean value of 90.4 beats/min. (S.D. ± 3.033 and t = 0.884).

3. Trendelenburg's position lead to significant increase in the three sub-groups:

Sub-group a: Pulse rate ranged from 80-120 beats/min. with a mean value of 101.6 beats/min. (S.D. ± 12.930 and t = 3.998).

Sub-group b: Pulse rate ranged from 86 - 98 beats/min. with a mean value of 92 beats/min. (S.D. ± 9.643 and t = 3.782).

Sub-group c: Pulse rate ranged from 96-102 beats/min. with a mean value of 98.4 beats/min. (S.D. ± 1.095 and t = 18.814).

4. Insufflation with carbon dioxide: Pulse rate/min. during insufflation with carbon dioxide showed significant increase in the three subgroups compared with the pre-operative pulse rate/min.

Sub-group a: Pulse rate ranged from 84 - 126 beats/min. with a mean value of 108 beats/min. (S.D. ± 13.74 and t = 2.864).

Sub-group b: Pulse rate ranged from 90 - 102 beats/min. with a mean value of 96 beats/min. (S.D. ± 4.243 and t = 8.434).

Sub-group c: Pulse rate ranged from 100 - 106 beats/min. with a mean value 102.8 beats/min. (S.D. ± 0.894 and t = 34).

5. At the end of the procedure the three sub-groups showed the following data:

Sub-group a: Pulse rate ranged from 76 - 96 beats/min.

with a mean of 84.8 beats/min. (S.D. ± 4.775. The decrease was insignificant (t = 1.622).

Sub-group b: Pulse rate ranged from 76 - 86 beats/min. with a mean value of 79.8 beats/min. (S.D. ± 3.286. The decrease was insignificant (t = 0.272).

Sub-group c: Pulse rate/min. ranged from 86 - 96 with a mean of 924 (S.D. ± 5.215 beats/min.). The increase was insignificant (t = 0.343).

II. Changes in the mean arterial blood pressure: (Tables IX a,b and Fig. 6)

Pre-operative data:

Sub-group a: The mean arterial blood pressure ranged from 86.7 - 91.7 torr with a mean value 89.28 torr (S.D. ± 2.438).

Sub-group b: The mean arterial blood pressure ranged from 86 - 93.3 torr with a mean value 89.38 torr ± 9.074.

Sub-group c: The mean arterial blood pressure ranged from 88.6 - 93.3 torr with a mean value of 91.28 torr ± 22.269.

Due to the effects of analgesic drug the mean arterial blood pressure showed increase in the three sub-groups.

Sub-group a: The mean arterial blood pressure ranged from 87.3 - 93.3 torr with a mean value of 90.74 torr (S.D. ± 1.098). The decrease was significant (t = 3.014).

Sub-group b: The mean arterial blood pressure ranged from 90.7 - 95.3 torr with a mean value of 92.74 torr (S.D. ± 2.216). The decrease was significant (t = 3.390).

Sub-group c: The mean arterial blood pressure ranged from 90.3 - 93.3 torr with a mean value 91.5 torr (S.D. ± 2.181). The decrease was insignificant (t = 0.225).

Insufflation with carbon dioxide lead to significant increase in the mean arterial blood pressure of the three sub-groups as follows:

Sub-group a: The mean arterial blood pressure ranged from 95.3 - 103.3 torr with a mean value 99.72 torr (S.D. ± 6.065 and t = 3.864).

Sub-group b: The mean arterial blood pressure ranged from 95.3 - 99.0 torr with a mean value of 97.46 torr (S.D. ± 2.164 and t = 9.090).

Sub-group c: The mean arterial blood pressure ranged from 94.3 - 98.3 torr with a mean value of 96.7 torr (S.D. ± 0.759 and t = 15.941).

Trendelenburg's position lead to significant increase in the mean arterial blood pressure.

Sub-group a: The mean arterial blood pressure ranged from 93.3 - 96.7 torr with a mean value of 93.98 torr (S.D. ± 3.555 and t = 2.955).

Sub-group b: The mean arterial blood pressure ranged from 88.3 - 95.7 torr with a mean value of 92.72 torr (S.D. ± 1.683 and t = 2.135).

Sub-group c: The mean arterial blood pressure ranged from 90.6 - 93.6 torr with a mean value of 92.68 torr (S.D. ± 1.739 and t = 2.724).

Deflation of the abdomen from carbon dioxide and return the patients to normal horizontal plane lead to insignificant increase in the mean arterial blood pressure.

Sub-group a: The mean arterial blood pressure ranged from 91.3 - 95.3 torr with a mean value of 92.78 torr (S.D. ± 2.538 and t = 2.084).

Sub-group b: The mean arterial blood pressure ranged from 88.3 - 93.7 torr with a mean value of 91.98 torr (S.D. ± 1.426 and t = 2.075).

Sub-group c: The mean arterial blood pressure ranged from 89.6 - 94.3 torr with a mean value of 92.02 torr (S.D. ± 0.733 and t = 2.062).

Table I: Twenty patients under general anaesthesia.

| Patient No. | Age in years | Weight in kg. | Operation |
|---|---|---|---|
| 1 | 26 | 55 | Diagnostic laparoscopy |
| 2 | 22 | 65 | " " |
| 3 | 28 | 70 | " " |
| 4 | 34 | 60 | " " |
| 5 | 17 | 55 | " " |
| 6 | 28 | 60 | " " |
| 7 | 28 | 65 | " " |
| 8 | 24 | 48 | " " |
| 9 | 17 | 50 | " " |
| 10 | 25 | 58 | " " |
| 11 | 30 | 63 | " " |
| 12 | 23 | 70 | " " |
| 13 | 15 | 55 | " " |
| 14 | 30 | 58 | " " |
| 15 | 28 | 65 | " " |
| 16 | 25 | 60 | " " |
| 17 | 39 | 50 | Tubal ligation |
| 18 | 35 | 70 | Tubal ligation |
| 19 | 35 | 65 | Tubal ligation |
| 20 | 38 | 65 | Tubal ligation |
| Range | 15-39 | 48-70 | 16 Diagnostic laparoscopy |
| Mean | 27.35 | - | 4 Tubal ligation |

Table II: Changes in pulse rate/min. of patients under general anaesthesia.

| Patient No. | Pre-op. beats/ min. | After induction beats/min. | Trendelenburg beats/ min. | Insufflation beats/min. | Deflation and flat position beats/min. |
|---|---|---|---|---|---|
| 1 | 92 | 90 | 120 | 120 | 96 |
| 2 | 92 | 88 | 96 | 100 | 94 |
| 3 | 86 | 86 | 102 | 104 | 94 |
| 4 | 90 | 92 | 104 | 98 | 90 |
| 5 | 90 | 92 | 108 | 106 | 92 |
| 6 | 80 | 76 | 90 | 96 | 88 |
| 7 | 92 | 90 | 96 | 96 | 90 |
| 8 | 86 | 92 | 98 | 102 | 90 |
| 9 | 92 | 102 | 120 | 120 | 98 |
| 10 | 88 | 92 | 104 | 100 | 90 |
| 11 | 98 | 98 | 120 | 120 | 96 |
| 12 | 86 | 86 | 96 | 98 | 84 |
| 13 | 86 | 92 | 130 | 120 | 98 |
| 14 | 78 | 78 | 88 | 90 | 80 |
| 15 | 82 | 82 | 92 | 94 | 86 |
| 16 | 80 | 100 | 120 | 110 | 96 |
| 17 | 76 | 90 | 110 | 106 | 88 |
| 18 | 76 | 76 | 88 | 90 | 86 |
| 19 | 82 | 82 | 86 | 92 | 82 |
| 20 | 78 | 78 | 84 | 90 | 84 |
| Range | 76-98 | 76-102 | 84-130 | 90-120 | 82-98 |
| Mean | 85.5 | 88.1 | 102.6 | 102.6 | 90.1 |
| S.D. ± | 14.05 | 6.055 | 17.129 | 9.583 | 5.112 |
| t | | 1.921* | 4.49* | 8.175* | 4.024* |

t is significant if more than 1.729 at P 0.05

Table III: Changes in the mean arterial blood pressure in patients under general anaesthesia.

| Patient No. | Pre-op. torr | Induction torr | Trendelen-burg torr | Insuffla-tion torr | Deflation torr |
|---|---|---|---|---|---|
| 1 | 95.3 | 95.3 | 106.3 | 110.6 | 97.0 |
| 2 | 93.3 | 93.3 | 102.0 | 104.7 | 95.2 |
| 3 | 95.3 | 93.0 | 97.0 | 110.0 | 96.0 |
| 4 | 92.2 | 91.0 | 101.2 | 106.7 | 93.3 |
| 5 | 93.3 | 86.0 | 96.0 | 97.3 | 94.2 |
| 6 | 93.3 | 93.3 | 95.3 | 100.0 | 93.3 |
| 7 | 95.3 | 95.3 | 94.3 | 101.0 | 96.7 |
| 8 | 86.7 | 90.0 | 94.0 | 100.7 | 90.0 |
| 9 | 93.3 | 93.3 | 92.7 | 98.3 | 94.0 |
| 10 | 93.7 | 91.0 | 97.7 | 106.7 | 93.3 |
| 11 | 93.3 | 88.3 | 103.3 | 120.0 | 103.3 |
| 12 | 93.3 | 93.3 | 96.7 | 103.3 | 95.3 |
| 13 | 110.0 | 100.7 | 101.7 | 120.0 | 94.7 |
| 14 | 88.3 | 88.3 | 89.3 | 93.3 | 88.3 |
| 15 | 93.3 | 93.3 | 100.0 | 105.3 | 100.0 |
| 16 | 90.1 | 90.1 | 90.0 | 100.0 | 93.3 |
| 17 | 86.7 | 86.7 | 88.3 | 102.2 | 93.3 |
| 18 | 83.3 | 83.3 | 90.0 | 91.3 | 91.3 |
| 19 | 88.3 | 88.3 | 93.3 | 96.3 | 93.3 |
| 20 | 89.3 | 89.0 | 88.3 | 92.7 | 88.3 |
| Range | 83.3-100 | 83.3-100.7 | 88.3-105.3 | 91.3-120 | 88.3-103.3 |
| Mean | 92.4 | 91.14 | 95.87 | 98.295 | 94.205 |
| S.D. $\pm$ | 5.325 | 3.159 | 4.617 | 5.514 | 5.048 |
| t | | 1.784 | 3.313 | 8.763 | 1.457 |

t is significant if more than 1.729 at P 0.05.

Table IV: Patients with extradural analgesia.

| Patient No. | Age in years | Weight in kg. | Operation |
|---|---|---|---|
| 1 | 25 | 65 | Diagnostic laparoscopy |
| 2 | 18 | 70 | " " |
| 3 | 22 | 60 | " " |
| 4 | 17 | 65 | " " |
| 5 | 25 | 70 | " " |
| 6 | 38 | 75 | Tubal ligation |
| 7 | 32 | 70 | Tubal ligation |
| 8 | 36 | 75 | Tubal ligation |
| 9 | 38 | 65 | Tubal ligation |
| 10 | 35 | 72 | Tubal ligation |
| Range | 17-38 | 60-75 | 5 Diagnostic<br>5 Tubal ligation |
| Mean | 28.6 | | |

Table V: Changes in pulse rate of patients under extradural analgesia.

| Patient No. | Pre-op. beats per minute | After injection beats/min. | Trendelenburg beats/min. | Insufflation beats/min. | Deflation and flat position beats/min. |
|---|---|---|---|---|---|
| 1 | 80 | 90 | 76 | 72 | 72 |
| 2 | 80 | 72 | 18 | 78 | 72 |
| 3 | 80 | 84 | 90 | 90 | 80 |
| 4 | 84 | 78 | 92 | 96 | 78 |
| 5 | 78 | 80 | 90 | 96 | 86 |
| 6 | 82 | 82 | 96 | 98 | 88 |
| 7 | 84 | 80 | 96 | 98 | 82 |
| 8 | 92 | 86 | 96 | 96 | 86 |
| 9 | 82 | 80 | 84 | 86 | 84 |
| 10 | 78 | 78 | 88 | 86 | 76 |
| Range | 78-92 | 72-90 | 76-96 | 72-98 | 72-88 |
| Mean | 82 | 81 | 88.6 | 89.6 | 80.4 |
| S.D. ± | 14.071 | 5.437 | 6.257 | 8.208 | 5.846 |
| t | | 0.56 | 3.335* | 2.927* | 0.973 |

t is significant if more that 1.833 at P 0.05

Table VI: Changes in the mean arterial blood pressure in patients under extradural block.

| Patient No. | Pre-op. torr | Induction torr | Trendelen-burg torr | Insufflation torr | Deflation torr |
|---|---|---|---|---|---|
| 1 | 93.3 | 93.3 | 103.3 | 103.3 | 88.3 |
| 2 | 88.3 | 88.3 | 86.7 | 93.3 | 88.6 |
| 3 | 93.3 | 96.3 | 93.0 | 96.7 | 93.3 |
| 4 | 93.3 | 103.3 | 103.3 | 106.7 | 93.3 |
| 5 | 93.3 | 98.3 | 91.7 | 103.3 | 96.0 |
| 6 | 93.3 | 93.3 | 96.6 | 102.6 | 90.1 |
| 7 | 93.3 | 96.3 | 90.1 | 103.3 | 95.2 |
| 8 | 95.3 | 96.7 | 96.3 | 110.6 | 97.0 |
| 9 | 93.3 | 93.3 | 96.3 | 103.3 | 88.3 |
| 10 | 86.7 | 86.7 | 94.0 | 100.7 | 90.0 |
| Range | 86.7-95.3 | 86.7-103.3 | 86.7-103.3 | 93.3-110.6 | 88.3-97.0 |
| Mean | 92.34 | 94.58 | 95.13 | 102.38 | 92.01 |
| S.D.± | 2.652 | 2.882 | 4.893 | 3.722 | 3.054 |
| t | | 2.459 | 1.778 | 8.530 | 0.341 |

t is significant if more than 1.833 at P 0.05

Table VII: Patients under local analgesia.
Subgroup (a) with pethidine 100 mg.

| Patient No. | Age in years | Weight in kg. | operation |
|---|---|---|---|
| 1 | 25 | 65 | Diagnostic laparoscopy |
| 2 | 22 | 70 | Diagnostic laparoscopy |
| 3 | 22 | 75 | Diagnostic laparoscopy |
| 4 | 35 | 55 | Tubal ligation |
| 5 | 36 | 65 | Tubal ligation |
| Range | 22-36 | 55-75 | |
| Mean | 28 | | |
| | Subgroup (b) with 50 mg pethidine + 10 mg Diazepam | | |
| 1 | 25 | 70 | Diagnostic laparoscopy |
| 2 | 22 | 65 | Diagnostic laparoscopy |
| 3 | 34 | 75 | Tubal ligation |
| 4 | 33 | 75 | Tubal ligation |
| 5 | 35 | 65 | Tubal ligation |
| Range | 22-35 | 65-75 | |
| Mean | 29.80 | | |
| | Subgroup (c) with 50 mg pethidine + 30 mg Pentazocine | | |
| 1 | 20 | 75 | Diagnostic laparoscopy |
| 2 | 25 | 56 | Diagnostic laparoscopy |
| 3 | 23 | 58 | Diagnostic laparoscopy |
| 4 | 37 | 70 | Tubal ligation |
| 5 | 38 | 75 | Tubal ligation |
| Range | 20-38 | 56-75 | |
| Mean | 28.60 | | |

Table VIIIa: Changes in pulse rate/min. in patients with local analgesia.
a) Pethidine 100 mg. before operation.

| Patient No. | Pre-operative beats/min. | After analgesia beats/min. | Trendelenburg beats/min. | Insufflation beats/min. | Deflation beats/min. |
|---|---|---|---|---|---|
| 1 | 100 | 92 | 120 | 126 | 96 |
| 2 | 90 | 70 | 80 | 84 | 76 |
| 3 | 86 | 80 | 106 | 114 | 82 |
| 4 | 90 | 82 | 106 | 112 | 86 |
| 5 | 86 | 80 | 96 | 104 | 84 |
| | b) 50 mg pethidine + 10 mg diazepam. | | | | |
| 1 | 76 | 76 | 88 | 92 | 78 |
| 2 | 82 | 80 | 92 | 96 | 86 |
| 3 | 80 | 78 | 96 | 100 | 78 |
| 4 | 82 | 80 | 98 | 102 | 80 |
| 5 | 80 | 76 | 86 | 90 | 76 |
| | c) 50 mg pethidine + 30 mg pentazocine. | | | | |
| 1 | 86 | 88 | 96 | 100 | 88 |
| 2 | 90 | 92 | 100 | 104 | 92 |
| 3 | 88 | 90 | 96 | 100 | 90 |
| 4 | 90 | 94 | 98 | 104 | 96 |
| 5 | 92 | 88 | 102 | 106 | 86 |

Table VIIIb: Changes in pulse rate/min. of patients under local analgesia and systemic analgesics.

a) 100 mg pethidine.

| | Pre-op. beats/ min. | After analgesia beats/min. | Trendelenburg beats/min. | Insufflation beats/ min. | Deflation of flat position beats/min. |
|---|---|---|---|---|---|
| Range | 86-100 | 70-92 | 80-120 | 84-126 | 76-96 |
| Mean | 90.4 | 80.8 | 101.6 | 108.0 | 84.8 |
| S.D.± | 5.727 | 5.899 | 12.930 | 13.74 | 4.775 |
| t | | 3.639* | 3.998* | 2.864* | 1.622* |

b) 50 mg pethidine + 10 mg diazepam

| | | | | | |
|---|---|---|---|---|---|
| Range | 76-82 | 76-80 | 86-98 | 90-102 | 76-86 |
| Mean | 80.0 | 78.0 | 92.0 | 96.0 | 79.8 |
| S.D.± | 2.442 | 1.414 | 9.643 | 4.243 | 3.286 |
| t | | 1.163 | 3.782* | 8.434* | 0.272 |

c) 50 mg pethidine + 30 mg pentazocine

| | | | | | |
|---|---|---|---|---|---|
| Range | 86-92 | 88-94 | 96-102 | 100-106 | 86-96 |
| Mean | 89.2 | 90.4 | 98.4 | 102.8 | 92.4 |
| S.D.± | 2.28 | 3.033 | 1.095 | 0.894 | 5.215 |
| t | | 0.884 | 18.814* | 34.00* | 0.343 |

t is significant if more than 2.132 at P 0.05

Table IXa: Changes in the mean arterial blood pressure in patients under local analgesia.

a) Pethidine 100 mg.

| Patient No. | Pre-op. torr | Analgesia torr | Trendelen-burg torr | Insufflation torr | Deflation torr |
|---|---|---|---|---|---|
| 1 | 90.0 | 92.7 | 93.3 | 100.0 | 95.3 |
| 2 | 91.3 | 93.3 | 93.3 | 95.3 | 91.3 |
| 3 | 86.7 | 88.7 | 96.7 | 103.3 | 92.3 |
| 4 | 86.7 | 87.3 | 93.3 | 103.3 | 91.7 |
| 5 | 91.7 | 91.7 | 93.3 | 96.7 | 93.3 |
| | b) 50 mg pethidine + 10 mg diazepam | | | | |
| 1 | 88.3 | 90.7 | 93.0 | 95.3 | 91.3 |
| 2 | 86.0 | 93.3 | 88.3 | 96.7 | 88.3 |
| 3 | 89.0 | 91.7 | 93.3 | 98.0 | 93.3 |
| 4 | 90.3 | 92.7 | 93.3 | 99.0 | 93.3 |
| 5 | 93.3 | 95.3 | 95.7 | 98.3 | 93.7 |
| | c) 50 mg pethidine + 30 mg pentazocin | | | | |
| 1 | 88.6 | 90.3 | 90.6 | 94.3 | 89.6 |
| 2 | 90.6 | 90.3 | 93.3 | 96.6 | 90.6 |
| 3 | 93.3 | 90.3 | 92.6 | 98.3 | 94.3 |
| 4 | 90.6 | 93.3 | 93.6 | 96.6 | 92.3 |
| 5 | 93.3 | 93.3 | 93.3 | 97.6 | 93.3 |

Table IXb: Changes in the mean arterial blood pressure in patients under local analgesia.

a) 100 mg pethidine

| | Pre-operative torr | Analgesia torr | Trendelenburg torr | Insufflation torr | Deflation torr |
|---|---|---|---|---|---|
| Range | 86.7-91.7 | 87.3-93.3 | 93.3-96.7 | 95.3-103.3 | 91.3-95.3 |
| Mean | 89.28 | 90.74 | 93.98 | 99.72 | 92.78 |
| S.D. ± | 2.438 | 1.098 | 3.555 | 6.065 | 2.538 |
| t | | 3.014 | 2.955 | 3.864 | 2.084 |

b) 50 mg pethidine + 10 mg diazepam

| | | | | | |
|---|---|---|---|---|---|
| Range | 86.0-93.3 | 90.7-95.3 | 88.3-95.7 | 95.3-99.0 | 88.3-93.7 |
| Mean | 89.38 | 92.74 | 92.72 | 97.46 | 91.98 |
| S.D. ± | 9.074 | 2.216 | 1.683 | 2.164 | 1.426 |
| t | | 3.390 | 2.135 | 9.090 | 2.075 |

c) 50 mg pethidine + 30 mg pentazocin

| | | | | | |
|---|---|---|---|---|---|
| Range | 88.6-93.3 | 90.3-93.3 | 90.6-93.6 | 94.3-98.3 | 89.6-94.3 |
| Mean | 91.28 | 91.50 | 92.68 | 96.70 | 92.02 |
| S.D. ± | 22.269 | 2.181 | 1.739 | 0.759 | 0.733 |
| t | | 0.225 | 2.724 | 15.941 | 2.062 |

t is significant if more than 2.132 at P 0.05.

Fig. 1

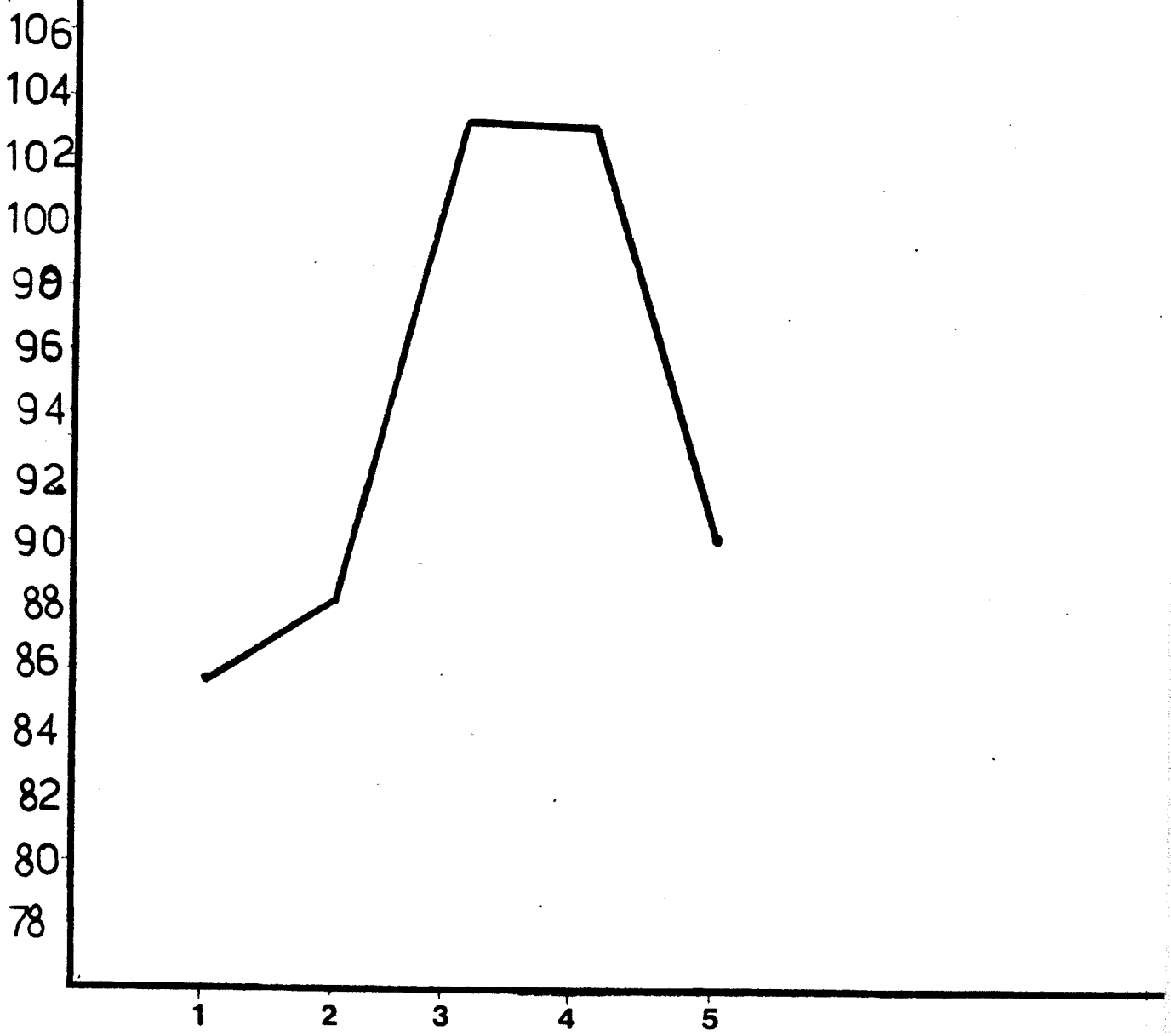
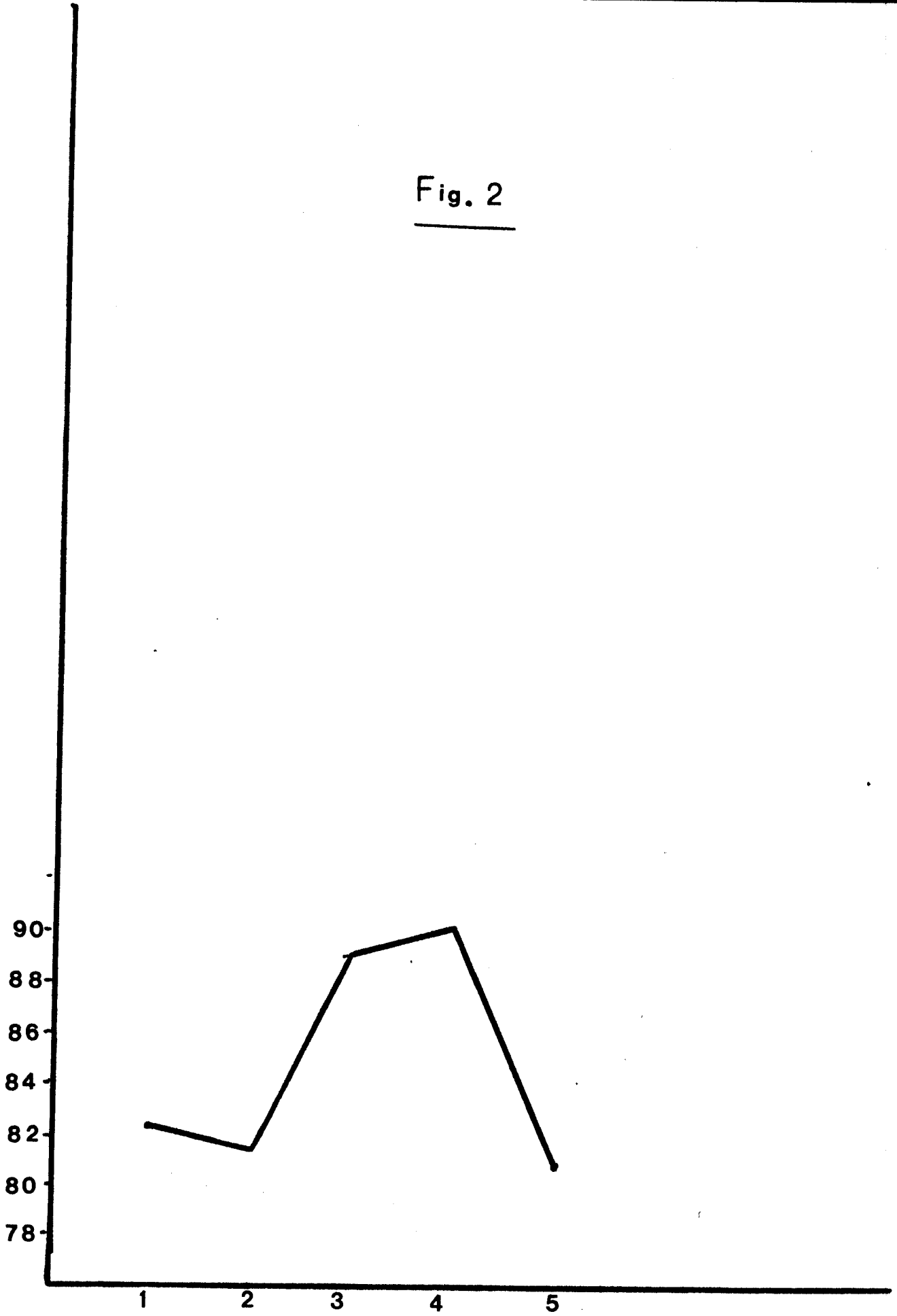



Fig.1: changes in pulse rate/min in patients under general anaesthesia

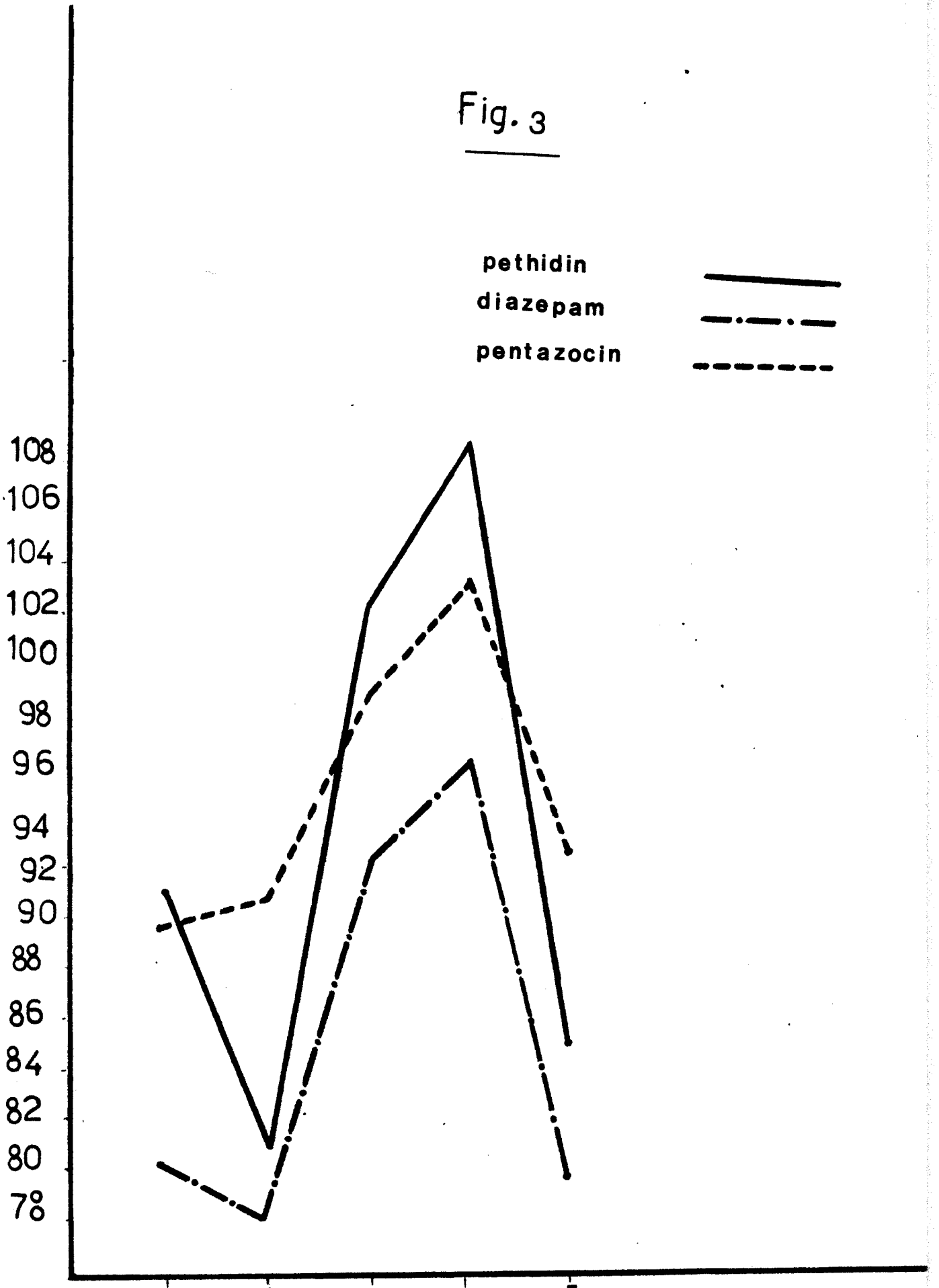
Fig. 2




changes in pulse rate/min in patients under exteradural block

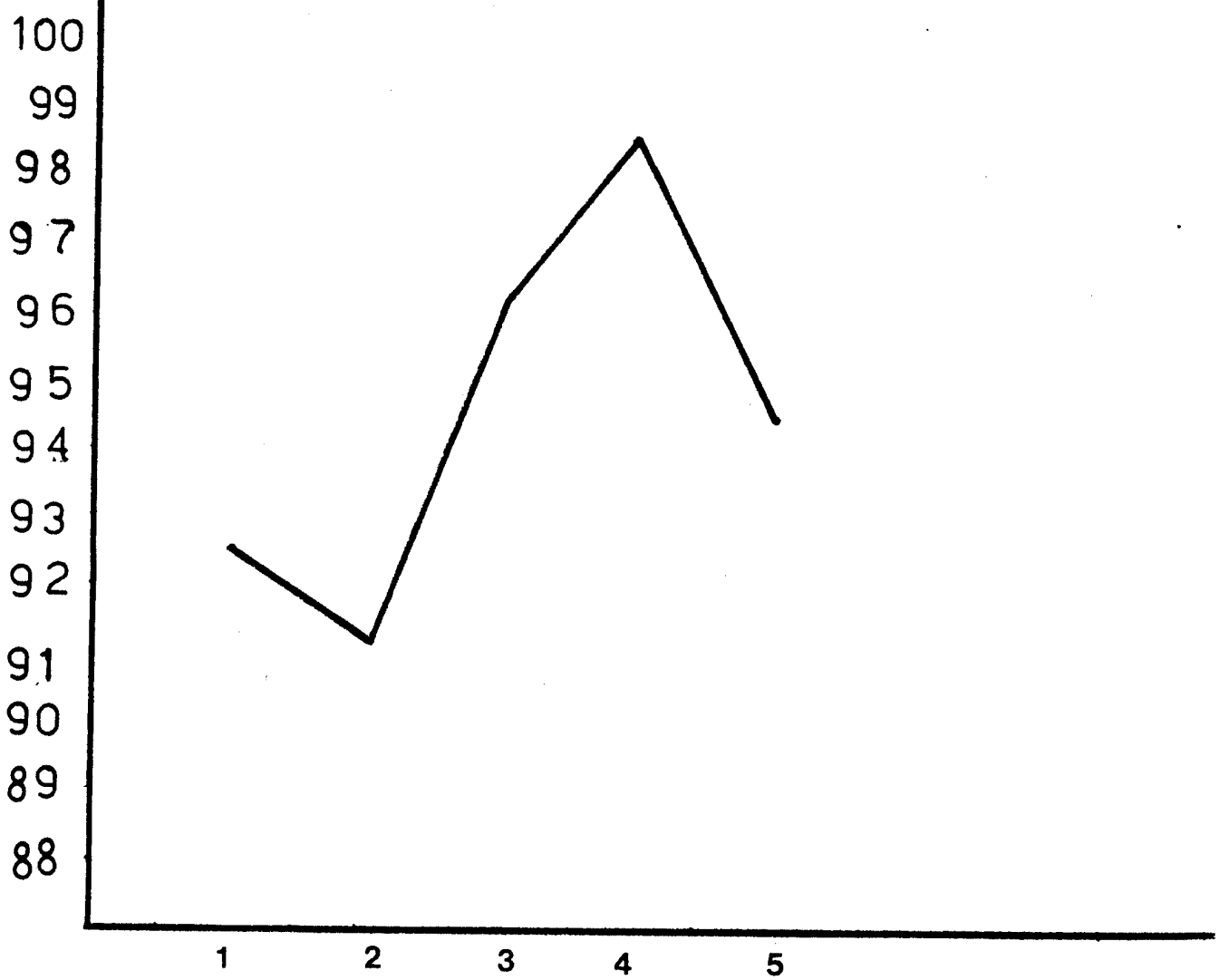
Fig. 2

Fig. 3




changes in pulse rate/min of patients under local analgesia

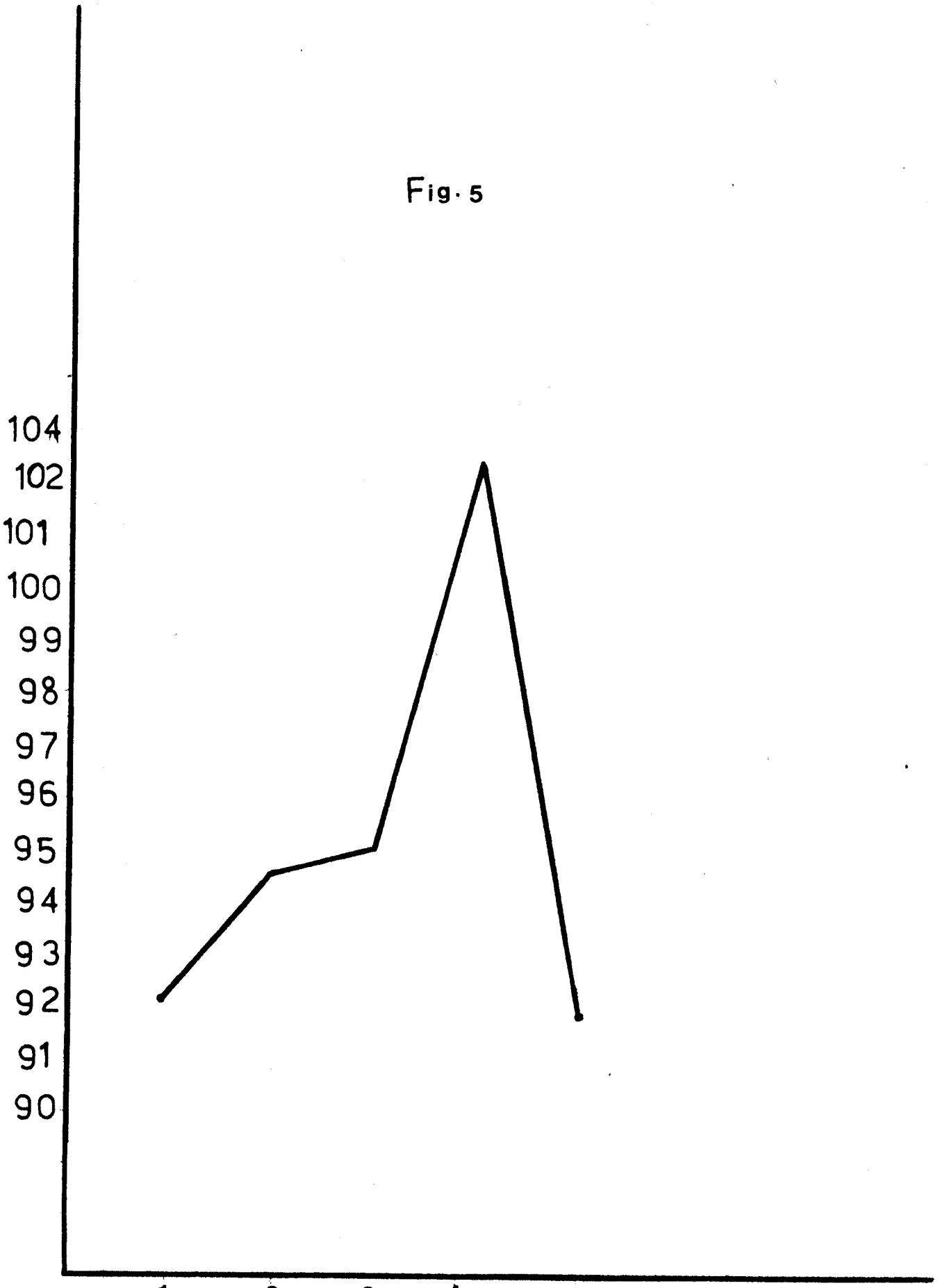
Fig. 4




changes in the mean A.B.P. in patients under general anaesthesia

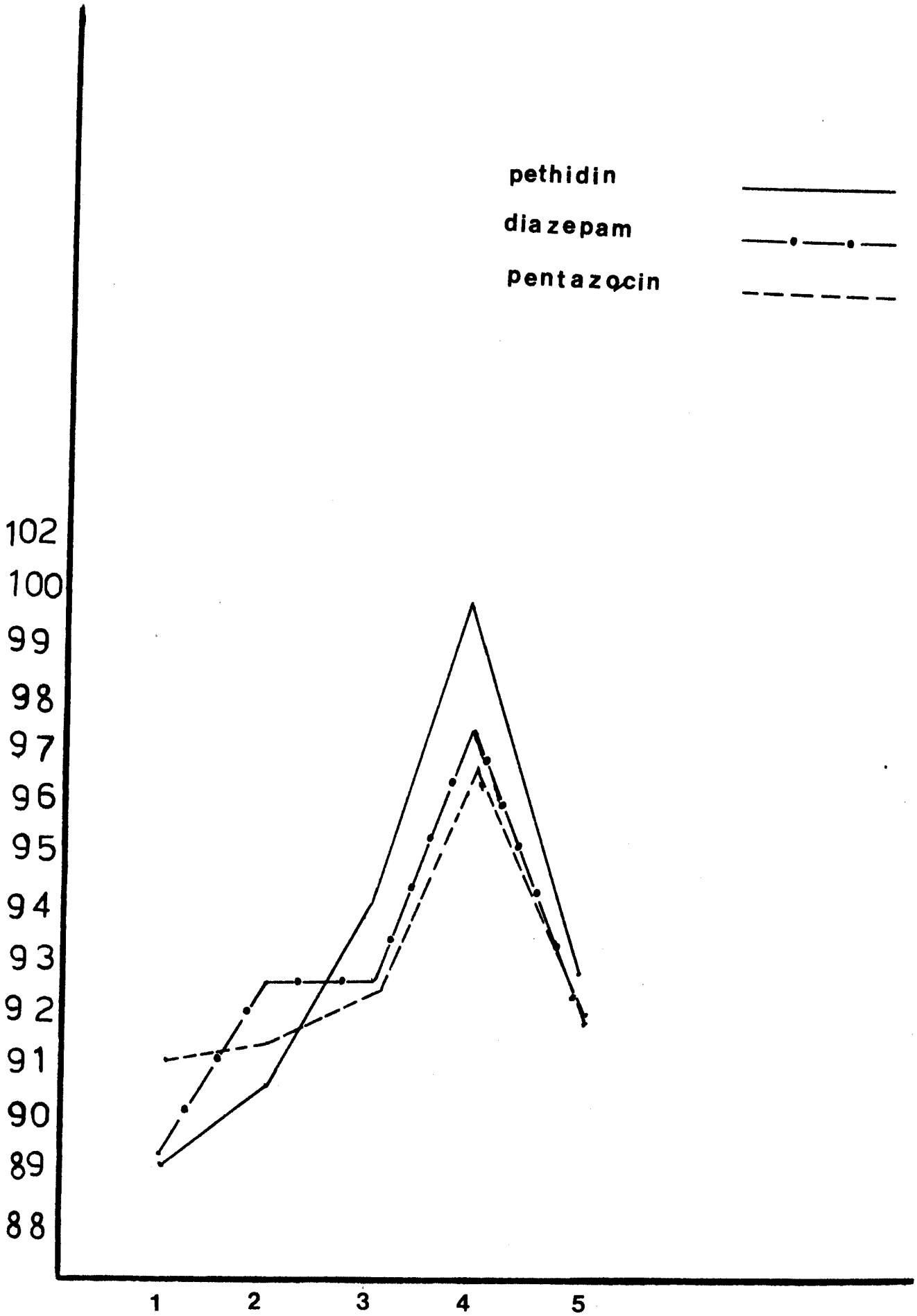
Fig. 4

Fig. 5




changes in the mean A.B.P. in patient under extradural block

Fig; 5




Fig;6: changes in the mean A.B.P. in patients under local analgesia

# CHAPTER V

# DISCUSSION

## DISCUSSION

The vital signs as regards pulse rate/min. and mean arterial blood pressure showing various changes during the different steps oflaparoscopic procedure. Certain factors shares in these changes as premedicant drugs e·g. atropine sulphate, the use of general systemic analgesics pethidine pentazocine and tranquilizeres as diazepam induction agents (thiopentone sodium) muscle relaxants (gallamine triethiodide), the effect of inhalational anaesthetic agents fluothane, nitrous oxide. Xylocaine hydrochloride in extradural and local block. Other factors as regards increase intra-abdominal pressure from insufflating gas, the effect of increased carbon dioxide tension in the arterial blood, and the effect of Trendelenburg's position will also shares in changes of vital signs·

Pulse rate/min.:

In group I. Significant increase in pulse rate/min. was observed after induction of anaesthesia. The increase may be due to the effect of atropine premedication, the effect of thiopentone and gallamine. Etsten and Li[38] and Fieldman[39] postulated that thiopentone may lead to increase in pulse rate/min. in Man while Doughty[40] & Kennedy[41] showed that gallamine injection may lead to increase in pulse rate.

With insufflation of carbon dioxide intraperitoneally. Significant increase in pulse rate/min. was observed when the intra-abdominal pressure reaches 20 cm $H_2O$. This was in agreement with that obtained by Kelman et al.[7], Marshal et al.[15] & Motew et al.[11] and Lenz et al.[8]. This increase in pulse rate/min. was obtained inspite the use of fluothane which may lead to decrease in pulse rate as shown by Price[42] and Black[43].

The cause of this increase in pulse rate/min. may be atributed to increase of carbon dioxide tension in the arterial blood absorbed from the peritoneal cavity after insufflation. This stimulates the chemoreceptors in the carotid and aortic bodies which send impulse to cardio-accelerator centre in the medulla leading to increase in heart rate[44]. The other cause of this increase in pulse rate/min. may be due to increase of intra-abdominal pressure which leads to increase of cardiac filling pressure and so increase of cardiac output and through Bainbridge's reflex leads to tachycardia[7].

In the present work further significant increase in pulse rate/min. was observed after Trendelenburg's position. This result was similar to that obtained by Scott et al.[45]. At the end of the procedure with deflation of the abdomen from

carbon dioxide, restoring the patients to the horizontal plane and recovery from anaesthesia, the pulse rate still showed significant increase as that obtained by Carson[46] and Motew et al.[11].

Kelman et al.[7] postulated that the pulse rate/min. more or less returned to its original value after deflation of the gas. The cause of this significant increase in pulse rate/min. may be attributed to inproper deflation of the abdomen from carbon dioxide, the patient did not return to complete horizontal plane or may be due to certain degree of carbon dioxide tension still found in the arterial blood[46], or it may be attributed to the mentioned previous causes of anaesthetic drugs.

In group II: Patients showed insignificant decrease in pulse rate/min. after injection of xylocaine hydrochloride epidurally. This decrease in pulse rate may be due to the effect of xylocaine as that shown by Bromage[47]. Insufflation of carbon dioxide intraperitoneally leads to significant increase in pulse rate/min. Caceres and Kim[13] found the same result in using spinal subarachnoid analgesia for laparoscopic tubal ligation. The cause of this increase in pulse rate may be due to the increased intra-abdominal pressure or may be attributed to increase carbon dioxide tension in the arterial blood[7].

Further significant increase in pulse rate/min. was observed due to Trendelenburg's position. At the end of the procedure and after deflation of carbon dioxide, insignificant decrease in pulse rate/min. was observed.

In the present work, patients of group III showed insignificant decrease in pulse rate/min. after injection of analgesic drug in sub-groups b & c, but sub-group a- showed significant decrease. After carbon dioxide insufflation intraperitoneally significant increase in pulse rate was observed in the three sub-groups. Brown et al.[5] and Jefferson[48] found the same results of increased pulse rate/min. after carbon dioxide insufflation with local analgesia for laparoscopy. This increase in pulse rate occurred inspite of the antiarrhythemic effect of xylocaine hydrochloride to prevent major increase in pulse rate[49]. With Trendelenburg's' position further significant increase in pulse rate/min. was observed. This result was inagreement to that obtained by Robert and Leslie[50] and Brown et al.[5]. Scott and Slawson[51] postulated that patient under local or epidural analgesia must be oxygenated well with oxygen mask during Trendlenburg's position, because this position shares with increased intra-abdominal pressure in impairment of ventilation which leads to hypercarbia plus that occurred due to absorption of carbon dioxide from the peritoneal cavity. At the end of the procedure

insignificant decrease in mean pulse rate/min. was observed in subgroup a & b, but in subgroup c receiving pentazocine as premedication, insignificant increase in mean pulse rate/min. was observed. Brown et al.[5] postulated that after deflation the pulse rate was more or less returned to its original value. The insignificant increase in mean pulse rate/min. in subgroup c may be referred to the effect of pentazocine[52].

Changes in the mean arterial blood pressure:

During the various steps of laparoscopic procedure the mean arterial blood pressure showed different changes during these steps.

In group I: Significant decrease of the mean arterial blood pressure was observed after induction. This decrease may be attributed to the effect of thiopentone sodium[38 & 53]. Insufflation of carbon dioxide intra-peritoneally was accompanied with significant increase in the mean arterial blood pressure. This result was inagreement with all researches applied to estimate changes in the mean arterial blood pressure with gas insufflation intraperitoneally[7,8,15,17,18].

This increase of mean arterial blood pressure will occur when the intra-abdominal pressure reaches 20 cm.$H_2O$ but when it reaches 40 cm.$H_2O$ or more, the arterial blood pressure begins to decline and in some patients marked hypotension occurs with

high intra-abdominal pressure[7]. Marshall et al.[15] used Beta-adrenergic blockers (Oxyprenolol) after carbon dioxide insufflation and noticed that there was some deminution of the previ usly increased arterial blood pressure.

The cause of increased mean arterial blood pressure after carbon dioxide insufflation may be due to effect of increased carbon dioxide tension in the arterial blood which affect the vasomotor centre directly and reflexly via the chemoreceptor[54]. With Trendelenburg's position significant increase in the mean arterial blood pressure was observed. The same result was obtained by Kelman[7], Marshall[15] and Motew et al.[11]. At the end of the procedure and after recovery from anaesthesia with deflation of the abdomen from carbon dioxide, insignificant increase in the mean arterial blood pressure was observed in group I patients. This result was inagreement to that obtained by Kelman et al.[7] and Marshall et al.[15].

In group II: Patients showed significant increase in the mean arterial blood pressure after injection of xylocaine epidurally. Significant increase in the mean arterial blood pressure was observed after insufflation of carbon dioxide intra-peritoneally. This was inagreement with that obtained by Caceres and Kim[13]. With Trendelenburg's position group II patients showed insignificant increase in the mean arterial

blood pressure. At the end of the procedure and deflation of carbon dioxide group II patients showed insignificant decrease in the mean arterial blood pressure.

In group III: (Patients receiving local analgesia with systemic analgesics)

Significant increase in the mean arterial blood pressure occurred in subgroups a & b after injection of xylocaine, and insignificant increase in subgroup c. This increase may be due to fear of the patients from the operation. Insufflation of carbon dioxide intra-peritoneally leads to significant increase in the mean arterial blood pressure in the three subgroups. The same result of increased mean arterial blood pressure after carbon dioxide insufflation was obtained by Penfield[55], Brown et al.[5] and Jefferson[48]. Trendelenburg's position lead to significant increase in the mean arterial blood pressure in the three subgroups. Deflation of the abdomen from carbon dioxide and return to horizontal plane lead to insignificant increase of the mean arterial blood pressure; so the blood pressure more or less returned to its pre-operative value.

From the above data we can state that the three groups showed significant increase in pulse rate/min., and the mean arterial blood pressure due to carbon dioxide insufflation

intraperitoneally. In Trendelenburg's position the three groups showed significant increase in the pulse rate/min. and the mean arterial blood pressure.

At the end of the procedure the pulse rate/min. showed significant increase in group I and insignificant increase in subgroup c of group III. Group II and subgroups a & b of group III showed insignificant decrease in their pulse rate/min. The mean arterial blood pressure showed insignificant increase in its value in the three groups.

# CHAPTER VI

# SUMMARY AND CONCLUSION

## SUMMARY AND CONCLUSIONS

Since Kelling in 1902 who used the laparoscope in dogs for the first time, the laparoscope is used nowdays in all branches of medicine concerned with structures and contents of the abdomen and pelvis.

Diagnosis of diseases of the female genital tract and therapeutic tubal sterilization are the most common uses of the pelvic laparoscopy.

In the present work three different techniques of anaesthesia namely: General endotracheal anaesthesia, spinal extradural block and local infiltration of anterior abdominal wall supplimented with systemic analgesic or tranquilizer were used. Carbon dioxide gas was used for abdominal insufflation. Several changes took place in pulse rate/min. and the mean arterial blood pressure during different steps of laparoscopic procedure.

In group I receiving general endotracheal anaesthesia with muscle relaxants, the pulse rate showed significant increase after induction of anaesthesia with thiopentone 2.5% and gallamine triethiodide. Significant increase in pulse rate took place after Trendelenburg's position and after abdominal insufflation with carbon dioxide. Deflation of the abdomen from

carbon dioxide with the patient in horizontal position at the end of the procedure was accompanied by significant increase in pulse rate/min. compared with the pre-operative data. As regards the mean arterial blood pressure it showed significant decrease after induction of anaesthesia. Significant increase in the mean arterial blood pressure was observed after Trendelenburg's position and after abdominal insufflation.

At the end of the procedure insignificant increase in the mean arterial blood pressure was recorded.

In group II receiving extradural block with xylocaine 1.5% supplimented with 100 mg. pethidine, insignificant decrease in pulse rate/min. took place after injection of xylocaine. Significant increase in pulse rate was observed after Trendelenburg's position andafter abdominal insufflation with carbon dioxide.

Insignificant decrease in pulse rate was recorded at the end of the procedure. The mean artterial blood pressure of group II showed insignificant increase after injection of xyclocaine. Significant increase in the mean arterial blood pressure was recorded after Trendelenburg's position and after abdominal insufflation. Insignificant decrease in the mean arterial blood pressure occurred at the end of the procedure.

Group III receiving local infiltration of the anterior abdominal wall with xylocaine and supplimented with 100 mg pethidine in subgroup a and 50 mg pethidine + 10 mg diazepam in subgroup b and 50 mg pethidine + 30 mg pentazocine in subgroup c.

As regards pulse rate/min. significant decrease took place in subgroup a, insignificant decrease in subgroup b and insignificant increase in subgroup c was observed after injection of analgesic drug and local infiltration. Significant increase in pulse rate/min. was recorded in the three subgroups' with Trendelenburg's position and after abdominal insufflation. At the end of the procedure insignificant decrease in pulse rate took place in subgroups a and b, but insignificant increase in subgroup c.

The mean arterial blood pressure showed significant increase in subgroups a and b and insignificant increase in subgroup c after analgesia. Significant increase in the mean arterial blood pressure was observed in the three subgroups with Trendlenburg's' position and after abdominal insufflation. At the end of the procedure insignificant increase in the mean arterial blood pressure was recorded in the three subgroups.

## RECOMMENDATIONS

1. General endotracheal anaesthesia with Intermittent positive pressure ventilation using volume preset ventilator is the most suitable method of anaesthesia for laparoscopic procedure.
2. General anaesthesia with muscle relaxant will lead to good muscular relaxation of the abdominal wall for the facilitation of the procedure and allows good oxygenation of the patient through the ventilator.
3. Local block can be used in out-patient clinics and in rural areas easily where the facilitis for general anaesthesia are not available, but the patients must be premedicated with good dose of analgesic or tranquilizer to allow easy procedure for the patient and surgeon.
4. Patients under extradural block must be premedicated with good dose of analgesic to prevent shoulder tip pain from irritation of the diaphragm with the insufflating gas.
5. All patients under different techniques of anaesthesia must be oxygenated well to prevent hypoxia occurred due to increased carbon dioxide tension in the arterial blood, and increased intra-abdominal pressure.

6. Carbon dioxide gas is prefered to other gases for insufflation due to its lower incidence of gas embolism and no possibility of explosion when diathermy is used.

7. Intra-abdominal pressure must not exceed 20 cm $H_2O$ to prevent complication of hypotension when it was raised above this level.

8. Trendelenburg's position must not be more than 15°-20° from the horizontal plane to prevent serious ventilatory and haemodynamic changes of increased head-down tilt.

9. Laparoscopy is considered to be contraindicated in cases of eschaemic heart and cases of low fixed cardiac output.

# CHAPTER VII

# REFERENCES

REFERENCES

1. Hodgson C, Mc Celland RMA and Newton JR. Some effects of peritoneal insufflation of carbon dioxide at laparoscopy. Anaesthesia 1970, 25:382.

2. Palmer AF. Gas insufflation for laparoscopy. Am Med J 1950, 14:232.

3. Lewis DG, Ryder W, Burn N, Weldon JT and Tacchi D. Laparoscopy: an investigation during spontaneous ventilation with halothane. Brit J Anaesth 1972, 44:685.

4. Drummond GB and Martin LVH. Pressure volume relationships in lung during laparoscopy. Brit J Anaesthesia 1978, 50:261.

5. Brown DR, Fishburne JI, Roberson VO and Hulka JF. Ventilatory and blood gas changes during laparoscopy with local anaesthesia. Am J Obstet & Gynecol 1976, 124:741.

6. Scott DB. Some effects of peritoneal insufflation of carbon dioxide at laparoscopy. Anaesthesia 1970, 25(4):590.

7. Kelman GR, Swapp, GH, Smith I, Benzie RJ and Nanette LM. Cardiac output and arterial blood gas tension during laparoscopy. Brit J Anaesth 1972, 44:1155.

8. Lenz RJ, Thomas TA and Wilkins DG. Cardiovascular changes during laparoscopy. Anaesthesia 1976, 31:4.

9. Baratz RA and Karis GH. Blood gas studies during laparoscopy under general anaesthesia. Anaesthesiology 1969, 30:463.

10. Corall IM, Knights K, Potter D and Strunin L. Arterial oxygen tension during laparoscopy with nitrous oxide in spontaneously breathing patients. Brit J Anaesth. 1974, 46:925.

11. Motew M, Inavkovich AD, Bieniarz J, Albrech RF, Zahed B and Scommegna A. Cardiovascular effects and acid-base and blood gas changes during laparoscopy. Am J Obstet & Gynecol 1973, 115:1002.

12. Alexander GD, Goldrath M, Brown EM. Out-patient laparoscopic sterilization under local anaesthesia. Am J Obstet & Gynecol 1973, 116:1068.

13. Caceres D and Kim K. Spinal anaesthesia for laparoscopic tubal sterilization. Am J Obstet & Gynecol 1978, 131:219.

14. Alexander GD and Brown EM. Physiologic alteration during pelvic laparoscopy. Am J Obstet & Gynecol 1969, 105: 1078.

15. Marshall RL, Jebson PJR, Davie IT and Scott DB. Circulatory effects of carbon dioxide insufflation of the peritoneal cavity for laparoscopy. Brit J Anaesth 1972, 44:680.

16. Marshall RL, Jebson PJR, Davie IT and Scott DB. Circulatory effects of peritoneal insufflation with nitrous oxide. Brit J Anaesth 1972, 44:1183.

17. Scott DB and Julian DG. Observation on cardiac arrhythmias during laparoscopy. Brit Med J 1972, 1:411.

18. Smith I, Benzie RJ, Gordon A, Namette LM, Kelman GR and Swapp GH. Cardiovascular effects of peritoneal insufflation of carbon dioxide for laparoscopy. Brit Med J 1971, 3:410.

19. Smith IM, Kelman GR, Nottage BJ, Milne RG and Swapp GH. Central venous pressure during laparoscopy. Anaesthesia 1975, 30:117.

20. Bradford DS and Dick HM. Fat embolism. Report of a case and discussion of current concepts of pathogenesis and treatment. Clin Ortho 1969, 65:218.

21. Prys-Robert C, Kelman GR, Greenbaun R and Robinson RH. Circulatory influences of artificial ventilation during nitrous oxide anaesthesia in man. Brit J Anaesth 1967, 39:533.

22. Ricardo M, Alf-Medegard, Rolf B and Sven-Erik T. Acid-base balance during laparoscopy. The effects of intraperitoneal insufflation of carbon dioxide or nitrous oxide on acid-base balance during controlled ventilation. Acta Obstet & Gynecol Scand 1979, 58:81.

23. Churchill DA. A practice of anaesthesia 4th edition page 1389. Published by Lloyd-Luke 1979.

24. Steptoe PC and Edwards RG. Control of human ovulation, fertilization and implantation. Proc R Soc Med 1974, 67(9):932.

25. Steptoe PC and Imran M. Combined procedure of aspiration termination and laparoscopic sterilization. Brit Med J 1969, 3:751.

26. Fear RE. Laparoscopy: a valuable eid in gynaecological diagnosis. Obstetric and Gynaecology 1968, 31:297.

27. Bruhl GR. Liver biopsy with laparoscopy. Brit Med J 1967, 2:411.

28. Scott NM, Hitzelberger AL and Parker GW. Role of peritoneoscopy in diagnosis of intra-abdominal diseases. Archives of Internal Medicine 1967, 120:207.

29. Arthure H. Laparoscopy hazard. Brit Med J 1970, 4:492.

30. Robinson JS, Thampson JM and Wood AW. Laparoscopy explosion hazard with nitrous oxide. Brit Med J 1975, 3:764.

31. Seed RF, Shakespeare TF and Moldoon MJ. Carbon dioxide homeostasis during anaesthesia for laparoscopy, Anaesthesia 1970, 25:223.

32. Moudesly RP. Thermal injury during laparoscopy. Brit Med J 1976, 46:1082.

33. Gaylord DA and Brown EM. Physiologic alteration during pelvic laparoscopy. Am J Obstet & Gynecol 1969, 105:1078.

34. Loffer FD, Pent D and Goodkin R. Sciatic nerve injury in patient undergoing laparoscopy. J Reprod Med 1978, 21(6):371.

35. Duffy BL. Regurgitation during pelvic laparoscopy. Brit J Anaesth 1979, 51:1089.

36. Kanti Giri. Experience of out-patient laparoscopic sterilization. Advances in voluntary sterilization 1973, page 36.

37. Calverley RK and Jenkins LC. The anaesthetic management of pelvic laparoscopy. Cand Anesth Soc J 1973, 20(5):679.

38. Etesten B and Li TH. Haemodynamic changes during thiopentone anaesthesia in humans. J Clin Invest 1955, 34:500.

39. Fieldman EJ, Ridley RW and Wood EH. Haemodynamic studies during thiopental sodium and nitrous oxide anaesthesia in humans. Anesthesiology 1955, 16:473.

40. Doughty AG and Wylie WD. An assessment of flaxedil (gallamine triethiodide BP). Proc Roy Soc Med 1951, 44:375.

41. Kennedy BR and Faraman JV. Cardiovascular effects of gallamine triethiodide in man. Brit J Anaesthesia 1968, 40:773.

42. Price HL. General anaesthesia and circulatory haemostasis. Physiol Rev 1960, 40:187.

43. Black GW and Mc Ardle L. The effect of halothane on the peripheral circulation in man. Brit J Anaesth 1962, 34:2.

44. Wiley LD, Dale LL and Charles JV. Effects of laparoscopic tubal ligation on arterial blood gases. Anaesth & Analg 1971, 50:349.

45. Scott DB, Lees MM and Tylor SH. Some respiratory effects of Trendelenburg position during anaesthesia. Brit J Anaesth 1966, 38:174.

46. Corson LS and Bolognse JR. Laparoscopic humances. Fertility and Sterility, 1971, 22:684.

47. Bromage PR. A comparison of the hydrochloride salts of lignocaine and prilocaine for epidural analgesia. Brit J Anaesth 1965, 37:407.

48. Jefferson AP. Laparoscopic sterilization under local analgesia. Obstet & Gynaecol 1977, 49:725.

49. Harison DC, Sprouse JH and Morrow AG. Anti-arrhythmic properties of lidocaine and procain amide. Clinical and physiological studies of their cardiovascular effects in man. Circulation 1963, 28:486.

50. Robert JT and Leslie B. Laparoscopy sterilization under local anaesthesia. Obstet & Gynaec. 1972, 39(4):635.

51. Scott DB and Slawson KB. Respiratory effects of Trendelenburg position. Brit J Anaesth 1968, 40:103.

52. Keats AS and Telford J. Studies of analgesic drugs. J Pharmacol Exp Ther 1964, 143:157.

53. Flickinger H, Fraimow W, Cathcart RT and Nealon TF. Effects of thiopental induction on cardiac output in man. Anaesth & Analg, 1961, 40:693.

54. Price HL. Effects of carbon dioxide on the cardiovascular system. Anaesthesiology 1960, 21:652.

55. Penfield AJ. Laparoscopic sterilization under local anaesthesia. Am J Obstet & Gynecol 1974, 119:733.

بداية الملخص العربي

(١)

كلنج هو اول من استعمل منظار البطن وذلك فى النكلاب عام ١٩٠٢ ويستعمل المنظار حاليا فى فروع الطب البشرى بمحتوياته المختصه بمكونات ومحتويات البطن والحوض. ومن اكثر استعمالات المنظار شيوعا تشخيص الامراض المتعلقة بالجهاز التناسلى للمراه وكذلك عملية التعقيم بربط الانابيب .

وفى هذا البحث استعملت ثلاث طرق مختلفة لتخدير حالات المنظار وهى :-
التخدير الكلى باستعمال انبوبة الحنجرة والتخدير النصفى خارج الام الجافيه والتخدير الموضعى لجدار البطن الامامى بمساعدة مزيلات الالم والمهدئات .
ثانى اكسيد الكربون هو الغاز الذى استعمل لنفخ البطن .
وقد لوحظت تغيرات مختلفة فى سرعة النبض ومعدل ضغط الدم الشريانى فى المراحل المختلفة لعملية المنظار .
ففى المجموعة الاولى حيث استعمل التخدير الكلى مع مرخى للعضلات . وجد ان سرعة النبض تزيد زيادة ملحوظة احصائيا بعد مرحلة الادخال التخديرى باستعمال عقارى الثيوبنتون والجالامين وبعد نفخ التجويف البريتونى بغاز ثانى اكسيد الكربون ووضع المريضه فى وضع ترند لنبرج وجدت ايضا زيادة ملحوظة احصائيا فى سرعة النبض . وهذه الزيادة تستمر بعد انتهاء العملية وتسريب غاز ثانى اكسيد الكربون من البطن وعودة المريضة الى الوضع الافقى . اما بالنسبه للتغيير فى معدل ضغط الدم الشريانى فى نفس المجموعة فقد وجد نقص ملحوظ احصائيا بعد الادخال التخديرى كما لوحظت زيادة احصائيه بعد نفخ البطن . وعند وضع المريضة فى وضع ترند لنبرج وجدت ايضا زيادة احصائيه فى معدل ضغط الدم الشريانى . وقد سجلت زيادة غير ملحوظة احصائيا بعد انتهاء العمليه .
فى المجموعة الثانية حيث استعمل التخدير النصفى خارج الام الجافيه بعقار النربلوكين ٠٫١ ٪ مع ١٠٠ ملجم بثدين وجدت نقص غير ملحوظ احصائيا فى سرعة النبض بعد حقن النربلوكين . ووجدت زيادة ملحوظة احصائيا فى سرعة النبض فى الدقيقه بعد وضع

المريضة فى وضع ترندلنبرج وايضا بعد نفخ البطن بثانى اكسيد الكربون وقد وجد نقص غير ملحوظ احصائيا فى سرعة النبض بعد انتهاء العمليه .

أما معدل ضغط الدم الشريانى فى نفس المجموعة فقد لوحظ زيادة غير احصائيه فى معدله بعد حقن النربلوكين . اما بعد النفخ بثانى اكسيد الكربون ووضع المريضة فى وضع ترندلنبرج فقد لوحظت زيادة احصائيه فى معدل ضغط الدم الشريانى وبعد انتهاء العمليه فقد وجد نقص غير ملحوظ احصائيا .

أما المجموعة الثالثه حيث استعمل التخدير الموضعى لجدار البطن الامامى بمساعدة ١٠٠ ملجم بثدين فى المجموعة الفرعيه ( أ ) او ٥٠ ملجم بثدين + ١٠ ملجم ديازبام فى المجموعة الفرعيه ( ب ) أو ٥٠ ملجم بثدين + ٣٠ ملجم بنتازوسين فى المجموعة الفرعية ( ج ) .

بعد حقن النربلوكين وجد نقص ملحوظ احصائيا فى سرعة النبض فى المجموعة الفرعيه ( أ ) اما المجموعتين الفرعيتين ( ب ) ، ( ج ) فقد نقص غير ملحوظ احصائيا .

وقد لوحظت زيادة احصائيه فى سرعة النبض فى المجموعات الفرعيه الثلاثه بعد نفخ البطن بثانى اكسيد الكربون وايضا بعد وضع المريضة فى وضع ترندلنبرج .

وبعد انتهاء العملية فقد وجد نقص غير ملحوظ احصائيا فى سرعة النبض فى مجموعتى ( أ ) ، ( ب ) اما المجموعة ( ج ) فقد وجد بها زيادة غير ملحوظة احصائيا مقارنة سرعة النبض قبل العملية . وفى معدل ضغط الدم الشريانى فى المجموعة الثالثه فقد وجدت زيادة ملحوظة احصائيا فى قيمته فى المجموعتين الفرعيتين ( أ ) ، ( ب ) فى حين وجدت زيادة غير ملحوظة فى قيمته فى المجموعة ( ج ) بعد حقن النربلوكين اما بعد النفخ بثانى اكسيد الكربون فقد وجدت زيادة ملحوظة احصائيا فى معدل ضغط الدم الشريانى . وجدت زيادة ملحوظة احصائيا بعد وضع المريضه فى وضع ترندلنبرج .

وفى نهاية عملية المنظار وجدت زيادة غير ملحوظة احصائيا فى المجموعات الفرعيه الثلاث فى معدل ضغط الدم الشريانى .